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detected, data units of any diversity signal (this will usually be the last signal selected) are passed to the data selector output as valid data. If a single error or error burst is detected in the at least two diversity signals, i.e. data units of the corresponding I or Q components disagree (quadrature modulation assumed), a sum of weighted distortion parameters f(SD) of the corresponding diversity signal components is used to identify the diversity data unit sequence which is most likely correct (non-erroneous). In the event of an error or error burst, the diversity data unit(s) which are least likely to be erroneous are multiplexed to the output, so that from the at least two diversity data unit sequences, one essentially error-free output data unit sequence is reconstituted.

Experimental studies on digital radios using 9QPR modulation have shown that the radio error bursts are random events which usually affect one to about 15 consecutive data units. As the S/N decreases, the error events which affect multiple consecutive data units appear more frequently.

Because of the statistical independence of the diversity signal error events, errors can be identified with a high probability by comparing corresponding data units of at least two diversity signals. If the data units agree, both signals are most likely correctly demodulated. If they do not agree, one diversity signal is incorrectly demodulated and the baseband signal distortion parameters of the errored and one or more immediately adjacent data units can be used to identify the diversity signal which is most likely in error.

Because the error burst detection process relies on a data unit comparison, errors which occur in all of the diversity signal components simultaneously cannot be corrected. Furthermore, if all diversity signals are experiencing an error rate of at least 10^{-2}, the error signal identification procedure may be less efficient and result in additional errors appearing at the selector output. If two diversity signals are used, and one receiver looses synchronization due to a very poor S/N or hardware failures, only one receiver is synchronized. During such condition, the data selector will pass the other signal to the output. Therefore, any error burst on the synchronized signal appears at the selector output. Taking all possible error alternatives into account, the output bit error rate of the data selector, when two diversity signals are used, can be expressed as:

$$BER_D = \frac{1}{\tau_M}\left\langle \begin{matrix} \tau_1\left(BER_{I1}+BER_{Q1}\right)+\tau_2\left(BER_{I2}+BER_{Q2}\right)+\frac{1}{\sigma} \\ \int_0^{\tau_M-\tau_1-\tau_2}\left\{\begin{matrix} BER_{I1}(t)BER_{I2}(t)P\left[BER_{I1}/BER_{I2}\right] \\ +BER_{Q1}(t)BER_{Q2}(t)P\left[BER_{Q1}/BER_{Q2}\right]\end{matrix}\right\}dt \end{matrix}\right\rangle \tag{20}$$

where τ_M is the bit error rate measurement period, τ_1 and τ_2 are fractions of τ during which only the first or second diversity signal is synchronized and σ is the overall selector efficiency. $P[BER_{I1} / BER_{I2}]$ and $P[BER_{Q1} / BER_{Q2}]$ are conditional probabilities.

It should be understood that the overall process, with the exception of the data selection process described below in conjunction with Figs. 5 and 6, may be practiced with a prior art diversity radio system components such as, but not limited to, the radio system components of Figs. 1 and 2, except that the combiners 28 and 48 respectively therein are replaced with the data selector and further, preferably, employ error correction code to further improve the integrity of the transmitted data in accordance with the prior art of Fig. 3. The transmitter used with the present invention may be in